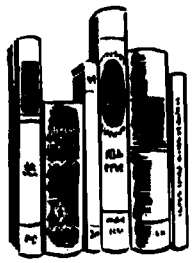

books reviewed

Transformation in Optics

By Lawrence Mertz. Published (1965) by John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10016. 116 + viii pp. incl. index. Illus. Diagrams. 9 by 6 in. Price $8.95.

Much of the progress in optics in the past two decades can be included under the heading, "Transformations in Optics." In this book, however, the author has chosen to restrict the discussion to a selection of topics which have interested him.

More than two-thirds of the book is devoted to a discussion of the theory and practice of Fourier transform spectroscopy. In this form of spectroscopy the spectral transmission of an interferometer is varied by changing the length of one of its arms. The recorded output of the interferometer as a function of the length of its arm is the Fourier transform of the spectrum of the light traversing it.

In the last part of the book, holograms are described in terms of the Fresnel transform. Some applications of this transform to spectroscopic and astronomical instruments are described.

Throughout this book the physical concepts underlying the use of transforms in optics are emphasized. The examples of applications to practical instruments show how creative people (including the author of the book) have been able to apply these concepts in ingenious ways. The book is thus of interest to a wider group of readers than those directly concerned with the applications discussed in it. It supplements and clarifies the more rigorous treatment of transforms in optics contained in other sources such as E. L. O'Neill's *Introduction to Statistical Optics.*—*Abe Offner*, Senior Engineer, The Perkin-Elmer Corp., Wilton, Conn. 06582.

CATV System Engineering

By William A. Rheinfelder. Published (1966) by Tab Books, Thurmont, Md. 21788. Graphs. Diagrams. Tables. 8½ by 5½ in. 206 pp. Ringbound. Price $9.95.

Here is good reading for anyone interested in examining the present state of the art in CATV systems design. The book is also useful to any technicain involved in the operation or maintenance of existing systems. It does not, however, serve the purpose of a good engineering text or handbook. The material is descriptive of current techniques and applications rather than tutorial.

There has been a lack of any good text on CATV system engineering in the short history of the CATV industry. This book is fairly typical of the published material to date. The author is obviously quite knowledgeable and has a clear understanding of the problems of CATV systems. He does bring together in one book much of the available information in a well organized manner. Unfortunately, several major debatable design concepts are presented as facts without any references to document them. An example of this is the statement concerning signal-to-noise ratio. This ratio is a particularly important design parameter in CATV systems design. At the beginning of the book the statement is made that "extensive tests have been made by the SMPTE and other organizations to relate observed picture quality to signal-to-noise readings, and to establish a quality standard of picture transmission. These tests indicate that a flawless television picture of studio quality results with a signal-to-noise ratio of 40 dB, while still very good picture quality is achieved with a signal-to-noise ratio of 30 dB." Because of the importance of SNR in system design, this statement is repeated and referred to throughout the book. Nowhere does the author give any reference to the exact source of this statement on signal-to-noise ratio. To the best of the

Reviewed by the SMPTE Advisory Committee on Special Effects in Motion Pictures: Herbert Meyer, Chairman, Russell Brown, Thomas G. Fisher, Jack Froehlich, Max Hankins, Ub Iwerks, Ivan Martin, Bob Mattey, Frederic L. Ponedel, John Roche, J. Edward Stembridge, Edward Stones, Virgil Summers.

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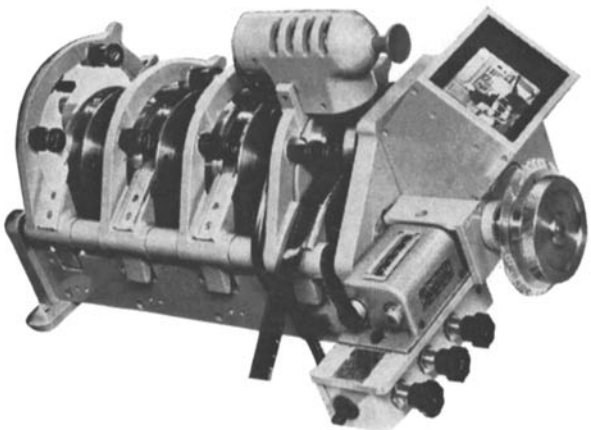

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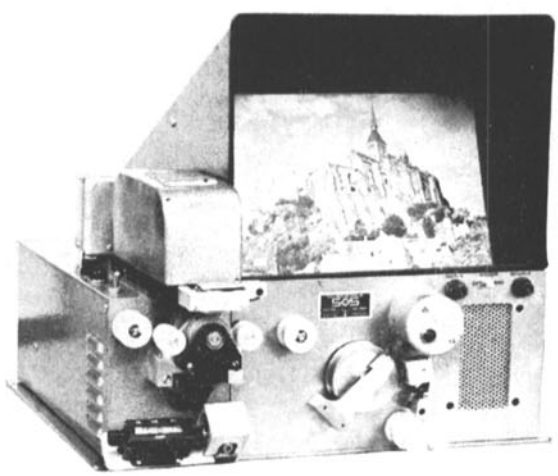

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reviewer's knowledge, no such tests have even been made by SMPTE. Studies have been made by the TASO Group under the sponsorship of the IRE and the results of the study published in the Proceedings of the IRE in June 1960. None of the tests run by the TASO Group indicate that a flawless television picture of studio quality results with 40-dB SNR. No studies have ever indicated a definitive SNR for a flawless television picture of studio quality, however, many design engineers in the television field try to attain a 60-dB SNR. At best, the author's statement is debatable. This kind of presentation of design parameters is made throughout the book, with no source reference, so many of the conclusions and designs presented are questionable. All the designs and systems demonstrated are workable but not necessarily the best that could be designed by a more thorough and rigorous approach to the problems.

The book is divided into ten chapters beginning with CATV systems concepts, through head end design, amplifier characteristics, system spacing theory, level diagrams, matching and reflection, and ending with chapters on automatic CATV systems and testing CATV amplifiers. The chapter on CATV amplifier characteristics contains an excellent discussion on noise factor and noise figure as well as a good discussion of cross modulation as distinct from intermodulation. A figure of merit for amplifiers is discussed. This is a simple technique for putting a number on amplifier performance without validating every step. It is an oversimplification that is useful for technicians but not for engineers. The section on head end design is also good, but no mention is made of the UHF capability that is currently being considered for CATV distribution systems. The chapter on spacing theory uses many rules-of-thumb in its designs. The chapter on level diagrams starts from the aforementioned debatable hypothesis on SNR. The chapter on matching and reflections is quite informative and useful. The chapter on automatic CATV makes assumptions based on current equipment limitations such as the complexity of AGC circuity, and oversimplifies the causes of level variation between channels. With these kinds of limitations it is difficult to accept the author's conclusions as being the best possible. In the final section on testing CATV amplifiers most test situations that are encountered in the field are discussed. None of the techniques are verified by mathematics although they seem logical. For instance, the VSWR measurements are not clear and there is no reason to believe that the technique described really measures the VSWR. The tests for overload and distortion are very subjective and qualitative. The author points out that they are close to meaningless. It would have been better to discuss the need for good measurements in this area without detailing the current inadequate techniques.

The most useful sections of the book for CATV systems designers are some of the appendixes at the rear of the book. There are excellent sections showing calculation of cumulative noise and overload, mathematical derivation of optimum spacing, typical equipment specifications, and CATV data and charts. These four appendixes are well collected and filled with information. There is an inadequate reference section and a very poor glossary of CATV material.

If this were a low-priced book, it might be a useful adjunct to the television engineer's library. Although a better book on CATV systems engineering does not exist at this time, it is worth waiting for.—*Irving S. Rosner*, Rosner Television Systems, Inc., 120 E. 56 St., New York, N.Y. 10022.

1960 Physics Electronics Titles

Published by Boston Technical Publishers, 5 Bryant Road, Lexington, Mass. 02173. 456 pp. 8½ by 11 in. Price $12.50.

Those dissatisfied with the usual methods for searching the technical literature should find this volume of exceptional interest. Computer technology has been brought to bear on this problem with interesting results. While unlikely to displace such standard works as the Engineering Index, its comparatively low cost may contribute to much greater accessibility. That it can perform a useful function in this respect, there is little doubt.

The edition under discussion is limited to titles of technical articles in the field of physics and electronics. Cataloging of these titles is based on the "key word" principle, a technique that is rapidly gaining acceptance in other fields particularly since it is so well suited to computer technology. The basic assumption is made that any article is identifiable by means of one or more key works in its title. Such words as transistor, diode, coil, and capacitor are among the more common key words in the electronics field. A word of this nature from the title of each indexed article is included in the list of key works. Most of these key words will be found in several titles and many titles will contain several key words.

The book has four main divisions:

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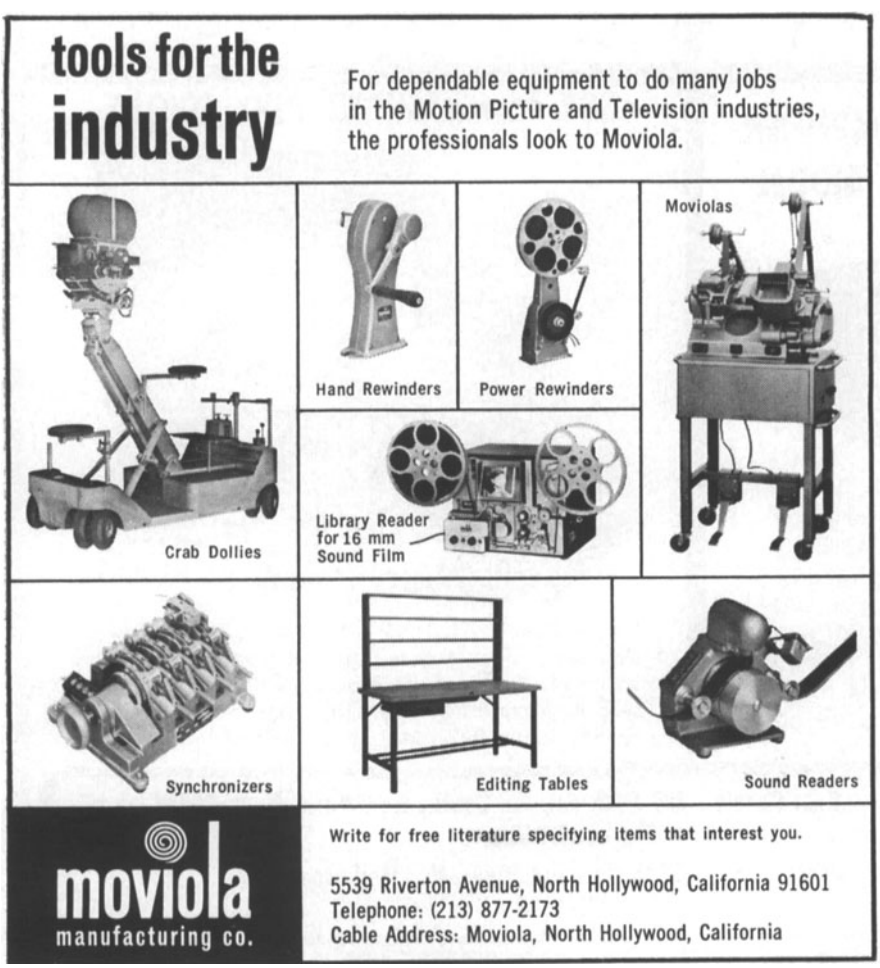
(2) the titles listed in the alphabetical order of the key words selected for this index (called the KWIC Index) together with identifying alphanumeric code symbols,

(3) the same titles in more complete form listed in the alphabetical order of the code symbols, and

(4) an alphabetical author index.

The search for an article on a given subject begins with the assumption that a certain key word will be included in the title. Looking up the key word in the KWIC Index will generally reveal a whole series of titles each containing the key word. If several key words are included in the title, it will be listed under each of the key words. After locating a title of interest and noting its code symbol, the next step is to look up the code symbol in the bibliographical index. The author's name, the journal volume and page numbers together with the complete title are listed here.

The ease of finding titles by this method can readily be demonstrated by looking up a few titles. Whether or not this method is superior to more conventional methods will



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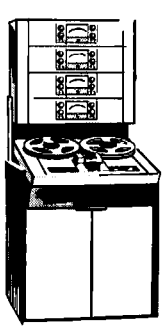

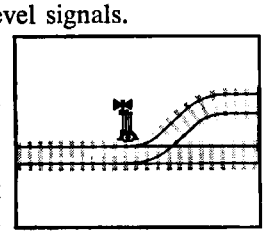

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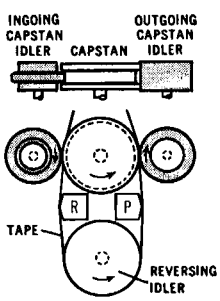

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probably depend on personal preferences in matters of this kind. Some of those trying this new method will miss the short abstracts of articles included in the Engineering Index. The particular virtue of the new indexing system is largely a consequence of its preparation with the aid of computer technology. Major advantages are lower cost and a substantial reduction in the time usually required to prepare such indexes.—*W. J. Poch*, Astro-Electronics Div., Defense Electronic Products, Radio Corp. of America, Princeton, N.J.

The Focal Encyclopedia of Photography (2nd ed.)

Published (1965) by Focal Press, Inc., 20 E. 46 St., New York, N.Y. 10017. 2 vol. boxed. 1,755 pp. Illus. Photographs. Diagrams. Price $39.

The first edition of this extensive work, published in 1956 and reviewed in the December 1957 issue of the *Journal* (the later desk edition was reviewed in the January 1961 issue.) was described as a "monumental work . . . of great and continuing value." The second edition is even more impressive in both size and coverage. Expanded to two volumes, the new edition contains 1,750,000 words and is longer by nearly 500 pages than the first edition. It contains 2,400 different articles prepared by 281 specialists from 28 countries, plus 1,750 diagrammatic illustrations and 450 photographs, including 16 pages in full color.

In the reviews of the full first edition and of the desk edition some qualms were expressed about containing so comprehensive attention to all aspects of photography in one volume, that it might have lost thoroughness and depth in a number of areas. With the new edition appearing in two volumes, it has been possible to overcome this objection, at least in part.

The scope of the work is somewhat greater than previously, now including newer developments such as those in color photography, optical glasses, simplifications in exposure indices and manipulations, etc. The thoroughness and depth of treatment have also been increased. In a general way, the emphasis that the first edition placed on being of especial aid to the practicing photographer has been retained.

The subject categories include: Theory, Practice, Subjects (from abstract photography to zoo pictures), Equipment, Materials, Processes, Optics, Development, Enlarging, Applied Photography, Color, Cinematography and Television, Graphic Arts, Industry and Commerce, and History (from Daguerre to Land).

It is interesting to note that a few things have remained the same. As a single illustration, the British figures on "ideal" screen luminance for motion-picture projection, for conditions ranging from private houses in complete blackout, to public cinemas, have not changed—although these still tend to be somewhat low as compared with American preferences.

More than ever, this book will be an extremely convenient work for general reference.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido Beach, L.I., New York 11561.

Measurement of Optical Radiations

By Georg Bauer. Published (1965) by Focal Press, Inc., 20 E. 46 St., New York, N.Y. 10017. 134 pp. Illus. Diagrams. 7 by 9½ in., Price $12.50.

The measurement of radiation is becoming of increasing importance in a variety of arts. The term "radiation" has itself been defined in different ways. Here it is specifically meant to cover the spectral region between 10 millimicrons (now called 10 nanometers) and 1/10 millimeter, to include the region from the "vacuum" ultraviolet to the "far" infrared. The measurements described are of physical radiation, not weighted for visual response characteristics.

The book is a translation from the German edition of 1962. It is a comprehensive text, that covers considerable introductory material on the generation, properties, and quantitative characteristics of electromagnetic radiation, together with blackbody and radiation laws.

It then goes into discussion of the various radiators and spectral analyzers, monochromators, and filters. This is followed by descriptions of the different types of detectors; incidentally photographic detectors are not mentioned.

Finally the text gets down to measurement proper, covering the various aspects of it, such as total radiation and spectral emission with monochromators and with filters. There is no mention of interferometric spectrometry. The text concludes with measurement of detector sensitivity (including sensitivity in the face of disturbances such as noise).

It would of course be impossible, with such a vast subject and such a thin book, to cover all this material in any great detail. The problem is handled by giving a fair summary description, with an extensive list of references (190 in all). It must be remarked that, as could be expected since the original book is in German, an overwhelming proportion of these references (over 100) are German with well under 50 (each) being British and American references. A small scattering of Russian, French, Japanese, and other references are included.

Thus the reader using this text for detailed guidance in work he has in hand can prepare himself to do some appreciable amount of supplementary reading in the literature, and should be well equipped in German (as he would probably need to be anyway in this field). If he is using the book for general study, and can be satisfied with summaries, and a moderate scattering of detail, he will find the work a generally useful survey.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido Beach, L.I., New York 11561.

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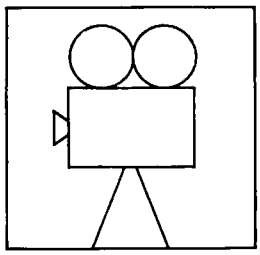

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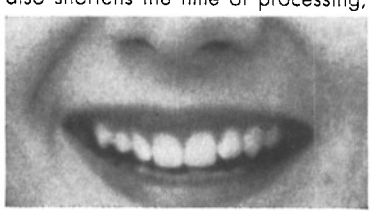

Photographed on EKTACHROME EF Film.

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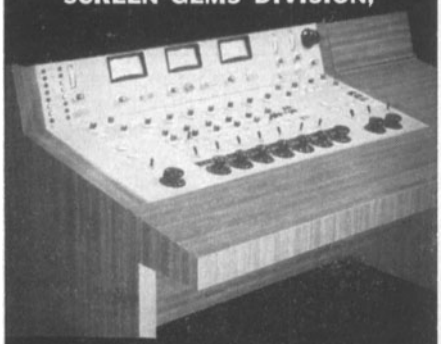

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ABSTRACTS OF PAPERS FROM OTHER JOURNALS

Abstracts of papers appearing in other journals chosen for their importance and possible value to researchers as well as those of timely interest, are published in the *Journal* from time to time. Many translations of abstracts from foreign journals, chiefly those of the USSR, are made available to the *Journal* by the Research Laboratories of the Eastman Kodak Company. As a rule, translations are made of the abstracts and not of the papers. The journals in which the papers appear can be consulted at some libraries. Current issues of *Tekhnika Kino i Televidinya* can be consulted at, or borrowed from, the Society's Headquarters Office.

Those requiring definitive and thorough searches of current literature and patents are referred to *Abstracts of Photographic Science & Engineering Literature* (*APSE*), published monthly by the Engineering Index, Inc., 33 E. 47 St., New York, N.Y. 10017, with the editorial cooperation of the Society of Photographic Scientists & Engineers.

The subject areas are grouped below:

Acoustics
Color
Film
General
Instrumentation and High-Speed Photography
Laboratory Practice
Lasers
Light Sources
Medical Photography
Miscellaneous Apparatus
Photographic Theory and Materials
Projection
Sound Recording and Reproduction
Television

ACOUSTICS

Acoustic irradiation in cinemas, Gerhard Zimmermann, *Bild und Ton, 18:* No. 9, 258–260, No. 10, 293–297, 1965.

The conditions required for first-class sound reproduction in confined rooms, especially in cinemas, are described with emphasis on noise levels, reverberation time, echolessness and other major influences.—M.C.

COLOR

Color photographic latitude of natural objects (in Russian), A. M. Kuritzŷn, *Tekh. Kino i Televideniya, 9:* 12–19, Aug. 1965.

A brief review is given of the literature on the results of investigations of the latitude (brightness interval) of natural subjects. Data are given from measurements of color photographic latitude of certain natural subjects, obtained with the aid of of the TsYa-1 color brightness meter, together with results from the comparison of the color photographic latitude of the measured subjects with the latitude of color motion-picture negatives.—S.C.G. (Translation of author's abstract.)

Measurement of color appearance, R. W. G. Hunt, *J. Opt. Soc. Am., 55:* 1540–1551, Nov. 1965.

An instrument has been constructed in which colors seen under various conditions of direct viewing by the left eye can be matched for color appearance by adjusting the proportions of a red, green and blue mixture seen by the right eye in the center of an adapting field of 1000 ft-L at a color temperature of 4000 K. The instrument has been used for measuring the appearance of the colors of a chart under various viewing conditions ranging from bright sunlight out of doors to ordinary tungsten room lighting. It was found that adaptation only partially corrected for changes in the color and intensity of adapting illuminations and, in addition, colors lost saturation markedly as the adapting intensity was lowered. It was also found that, if viewed by tungsten light in a dark room, a color reproduction having the same spectral reflectance curves as the original would appear to be appreciably more orange, darker, and less saturated than the original when viewed in sunlight.

Cathode-ray-tube color reproduction in relation to Gaussian spectral parameters, Ojars J. Sovers and Lewis J. Bodi, *J. Optical Soc. Am., 55:* 1643–1650, Dec. 1965.

Experimental spectral distributions are approximated by curves which are Gaussian in frequency. Color coordinates and luminosities are calculated as functions of the Gaussian parameters. This approach is extended to make possible a detailed analysis of the problem of color reproduction in tricolor cathode-ray tubes. Variations in luminosity, color triangle area, and radiance ratios are related to the two parameters defining the Gaussian distributions.

FILM

The most important tasks in the development of narrow-gage cinematography (in Russian), V.G. Komar and N.D. Bernshteĭn, *Tekh. Kino i Televideniya, 9:* 9–17, May 1965.

Problems arising in the use of 16mm and 8mm in the Soviet National Cinema Network are discussed. The use of these films forms part of the wider picture of the correct apportionment of all the forms of cinematography now available to their appropriate places in the unified system. Extensive use of 16mm copies of standard gage films is foreseen for mobile cinemas and small cinemas in country regions. 8mm films are particularly suitable for schools and other teaching purposes.